1153-88 **VLDL Lipoprotein and Triglyceride Clearance by the Lung Is Markedly Reduced in Congestive Heart Failure**

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Simultaneous measurement of 16 lipoprotein particle concentrations in the right atrium and aortic root allow calculation of organ and circulation specific metabolism of individual particles. Initial studies showed consistent and significant reductions in plasma triglyceride (TG), and VLDL concentrations after passage through the lungs.
METHODS:Plasma was simultaneously sampled from the right atrium and aortic root in 25 patients undergoing combined right and left heart catheterization (16 Congestive heart failure (CHF), 9 Transplant/Valvular). Samples were analyzed using NMR spectroscopy (LipoMed) into chylomicrons, 6 VLDL sub-classes, IDL, 3 LDL subclasses and 5 HDL subclasses. Arterio-venous differences and clearance rates were calculated using hemodynamic information and thermodilution cardiac output. Paired t tests and logistic regression analysis were used to determine contributors to lipoprotein particle metabolism.
RESULTS: There is significant removal of triglyceride from VLDL during passage through the lungs, venous blood contains 90±13 mg/dl compared to 78±12 mg/dl in arterial blood,($p<0.005$). Specifically large VLDL 5+6 particles are reduced during passage through the lung from 22±5 to 9±3 mg/dl, p=0.01. Removal of TG from VLDL was reduced by 90% in patients with a current history of CHF; 110±14 vs 1278±197 mg/min ($p<0.0003$). There was no relationship between VLDL and VLDL TG metabolism and right atrial pressure or wedge pressure. There was no difference in VLDL metabolism between post-transplant and valvular patients.
CONCLUSIONS: These data confirm that the pulmonary circulation removes a significant amount of VLDL triglyceride, specifically from VLDL 5+6 particles during transit and that this removal is markedly reduced in patients with congestive heart failure. This abnormality reverts to normal after transplantation.

POSTER SESSION

1154 Hypertensive Heart Disease

Tuesday, March 19, 2002, 9:00 a.m.-11:00 a.m.
Georgia World Congress Center, Hall G
Presentation Hour: 9:00 a.m.-10:00 a.m.

1154-77 **Microalbuminuria Accompanies Concentric Type of Left Ventricular Geometric Pattern in Untreated Essential Hypertensive Subjects**

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Background: A slight elevated urinary albumin excretion (UAE) is well related with other target-organ damage. However the interaction between microalbuminuria (MA) and the spectrum of left ventricular (LV) geometric pattern in hypertension has not been well defined.
Methods: For this purpose, MA was determined in 3 non-consecutive 24-h urine samples as UAE of 20-200mg/24h in a group of 249 untreated hypertensive subjects. Echocardiographic classification of patients into LV geometric patterns was based on relative wall thickness values and on gender specific values for LV mass index (LVMI).
Results: The group of patients with MA (n=119) was matched for demographics with those without MA (n=130). Subjects with MA had significantly increased LVMI (111 vs 90 g/m2, $p<0.0001$), relative wall thickness (0.46 vs 0.41, $p<0.001$) and office BP (161/101vs148/97 mmHg, $p<0.005$). UAE was positively correlated to LVMI ($r=0.46$, $p<0.001$) and relative wall thickness ($r=0.47$, $p<0.001$). LV normal geometry (LV-NG), LV concentric remodeling (LV-CR), LV eccentric and concentric hypertrophy (LV-EH, LV-CH) was found in 34%, 33%, 12% and 21%, respectively. The incidence of LV-NG was significantly higher in normoalbuminuric compared to microalbumnuric subjects (55 vs 14%, $p<0.001$) while the incidence of LV-CH was significantly higher in microalbuminuric compared to normoalbuminuric subjects (32 vs 5%, $p<0.001$). Multiple regression analysis revealed that LV-CH was significantly associated with increased values of UAE and mean arterial pressure.
Conclusions: The higher prevalence of unfavorable LV geometric patterns in hypertensive subjects with MA compared to those without MA, may account for the worse cardiovascular outcomes associated with the presence of an increased UAE in hypertensive subjects.

1154-78 **Pulsed Tissue Doppler Distinguishes Difference of Longitudinal Myocardial Function Between Athletic and Hypertensive Left Ventricular Hypertrophy**

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Aim of the study: to analyze difference of longitudinal myocardial function between athletic and hypertensive left ventricular (LV) hypertrophy.
Methods: Standard Doppler echo and pulsed Tissue Doppler (TD) of posterior sepum and inferior wall (apical view) were performed in 20 competitive endurance athletes (water-polo players) (AT) and in 22 hypertensives (HT), all men, both having LV hypertrophy (LV mass index > 50 g/m2.7). By TD, the following measurements of myocardial longitudinal function were assessed for each wall: systolic peak velocities (Sm), precontraction time (PCTm), contraction time (CTm), early (Em) and late (Am) diastolic peak velocities, Em/Am ratio, relaxation time (RTm).
Results: HT showed higher age, body mass index (BMI), heart rate (HR) and blood pressure than AT. LV mass index (61.4 ± 9.9 g/m2.7 in AT vs. 62.2 ± 8.7 g/m2.7 in HT, NS) and relative wall thickness were comparable between the 2 groups. After adjusting for age, HR and mean blood pressure, endocardial fractional shortening and all Doppler diastolic indexes were impaired in HT while TD showed lower Sm, Em and Em/Am ratio and longer RTm, PCTm and CTm, of both septal and inferior walls in HT. A cut-off point of transmitral E peak velocity < 0.74 m/s had a sensitivity of 72.7 % and a specificity of 85 % while a TD inferior Em peak velocity < 0.16 m/sec differentiated better AT and HT (sensitivity = 100 %, specificity = 95 %). After adjusting for HR, age and LV mass index by separate multilinear regression analyses, Em peak velocity of inferior wall had an independent positive association with LV end-diastolic diameter (ß coefficient = 0.72, $p<0.001$) in AT and an independent inverse association with LV end-systolic stress (ß = -0.62, $p<0.001$) in HT.
Conclusions: TD identifies mechanisms underlying difference of myocardial function between athletic and hypertensive LV hypertrophy. Early diastolic myocardial function is positively influenced by preload increase in AT and negatively related to increased afterload in HT. TD may be useful to differentiate physiologic and pathologic LV hypertrophy better than standard Doppler echocardiography.

1154-79 **Are Left Ventricular Mass, Geometry, and Function Related to Vascular Changes and/or Insulin Resistance in Longstanding Hypertension? A LIFE Substudy**

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Background: Vascular hypertrophy and insulin resistance have been associated with abnormal left ventricular (LV) geometry, while a possible association to abnormal LV function is less investigated.
Methods: In 89 patients with essential hypertension and electrocardiographic LV hypertrophy, we measured after two weeks of placebo treatment blood pressure, insulin sensitivity by hyperinsulinemic euglucemic clamp, minimal forearm vascular resistance (MFVR) by plethysmography, intima media cross-sectional area of the common carotid arteries (IMA) by ultrasound, LV mass, relative wall thickness (RWT), systolic function and diastolic filling by echocardiography.
Results: LV mass index correlated to IMA/height ($r=0.36$, $P=0.001$), serum insulin ($r=-0.25$, $P<0.05$), plasma glucose ($r=-0.34$, $P<0.01$), and showed a tendency towards a correlation to insulin sensitivity ($r=0.21$, $P=0.051$), but was unrelated to MFVR. Deceleration time of early diastolic transmitral flow correlated positively to IMA/height ($r=0.30$, $P<0.01$). The ratio between early and atrial LV filling peak velocity correlated negatively to MFVRmen ($r=-0.30$, $P<0.05$). Endocardial and midwall systolic LV function were not related to vascular hypertrophy, plasma glucose, serum insulin or insulin sensitivity.
Conclusions: High thickness of the common carotid arteries was associated with LV hypertrophy and longer deceleration time of early diastolic transmitral flow. High MFVR was associated with low ratio between early and atrial LV filling peak velocity. This may suggest that systemic vascular hypertrophy contribute to abnormal diastolic LV relaxation in patients with hypertension and electrocardiographic LV hypertrophy. However, insulin resistance was not related to LV hypertrophy or reduced LV function in this population.

1154-80 **Safety and Efficacy of Enhanced External Counterpulsation in Hypertensive Patients With Refractory Angina Pectoris: Short- and Long-Term Follow-Up**

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Background: The safety and efficacy of EECP in patients with refractory angina pectoris has been well studied. However the physiological beneficial effects may be secondary to reduction of systolic vascular resistance and afterload. Hypertensive patients therefore may proportionately derive enhanced clinical benefit.
Methods: This study examined 1995 patients enrolled in the International EECP Patient Registry who received an average of 35 hours of EECP treatment. 1353 patients (67.8%) were hypertensive (HTN). This group had a lower proportion of white males. They were more likely to have had prior PCI, CHF, DM, hyperlipidemia, and family history of CAD. HTN patients had more severe angina and used more nitrates. They also were more likely to use beta blockers, calcium channel blockers, and ACE inhibitors.
Results: EECP produced less diastolic augmentation in the HTN group. However at the end of treatment the HTN group showed similar reduction in anginal symptoms with 72.8% of HTN vs. 74.9% of non-HTN showing a decrease in at least one CCSC class. Reduction of nitroglycerin use however was less in the HTN; 52.7% of HTN using at baseline were no longer using vs. 60.5% of non-HTN ($p<.05$). Adverse cardiac events during the treatment period were extremely low in both groups, although HTN patients were significantly more likely to have exacerbation of congestive heart failure, and episodes of unstable angina. At six months the angina reduction was maintained similarly in both groups with 81% maintaining the reduction seen at post-EECP therapy. HTN patients did not show an increased rate of six month MACE but MI, congestive heart failure, unstable angina, and repeat EECP were all significantly higher than in the non-HTN group.
Conclusion: EECP therapy is safe and effective in hypertensive patients with achievement of similar reduction in angina to non-HTN group, however there is a slight increase in some adverse effects both in short-term and long-term.